What is claimed is:

1. An optical amplifier, comprising:

an erbium doped optical fiber (EDF) amplifying section; and

a Raman amplifying section,

wherein the Raman amplifying section has a temperature dependent gain profile which enables compensating for temperature dependent changes in a gain profile of the EDF amplifying section.

2. An optical amplifier according to claim 1,

wherein the Raman amplifying section comprises a wavelength lock grating whose transmission wavelengths shift toward the short wavelength side as the temperature increases.

3. An optical amplifier according to claim 2,

wherein the wavelength lock grating is disposed to have the same temperature as that of an EDF included in the EDF amplifying section.

4. An optical amplifier according to claim 2,

wherein the wavelength lock grating is an optical fiber having a grating in which the refractive index of a core thereof varies at a predetermined period.

5. An optical amplifier according to claim 1, wherein the Raman amplifying section is disposed upstream with respect to the EDF amplifying section.

6. An optical amplifier according to claim 1, wherein the Raman amplifying section is disposed downstream with respect to the EDF amplifying section.

7. An optical amplifier according to claim 1, wherein the EDF amplifying section and a wavelength lock grating are accommodated in single body of equipment.

8. A method for compensating for temperature dependent gain flatness of an optical amplifier comprising:

providing an EDF amplifying section and a Raman amplifying section in the optical amplifier; and

setting the temperature dependent gain profile of the EDF amplifying section and the temperature dependent gain profile of the Raman amplifying section to compensate for each other when temperature changes.

9. A method according to claim 8, wherein the Raman amplifying section comprises a wavelength lock grating whose transmission wavelengths shift toward the short wavelength side as the temperature increases.

10. A method according to claim 9, wherein the method further comprises making the temperature of the wavelength lock grating the same as that of an EDF included in the EDF amplifying section.

11. An optical transmission path comprising:

a base transmission path including a signal transmission optical fiber and an EDF amplifying section for amplifying signal light passing through the signal transmission optical fiber; and

a Raman amplifying section, which includes an excitation light source for performing a Raman type amplification using the signal transmission optical fiber as an amplifying medium, and a wavelength lock grating that transmits excitation light having a predetermined wavelength to input the excitation light into the signal transmission optical fiber, wherein

transmission wavelengths of the wavelength lock grating shift toward the short wavelength side as the temperature increases.

12. An optical transmission path according to claim 11, wherein the excitation light source comprises a plurality of different light sources.

13. An optical transmission path according to claim 12, wherein the plurality of different light sources have at least two different wavelengths.

14. An optical transmission path according to claim 12, wherein the plurality of different light sources have at least two different polarization planes.